FIG.1

1601
1602 ATT
1603
1610
1609
1608
(i)
1607
1606
After LC
formed laser beam
before LC
1604
1605
substrate stage controller

Object lense — 1606
1604
1611
1600

CCD
zoom lens (eyepiece lens)
Object lense
ring lighting
1606 CCD camera

FIG.2A

FIG.2B

FIG.3

START — substrate finishing crystallization

| 300 |

| outputted image data |

| 301 |

| 302 |

| 303 |

| 304 |

| 305 |

END
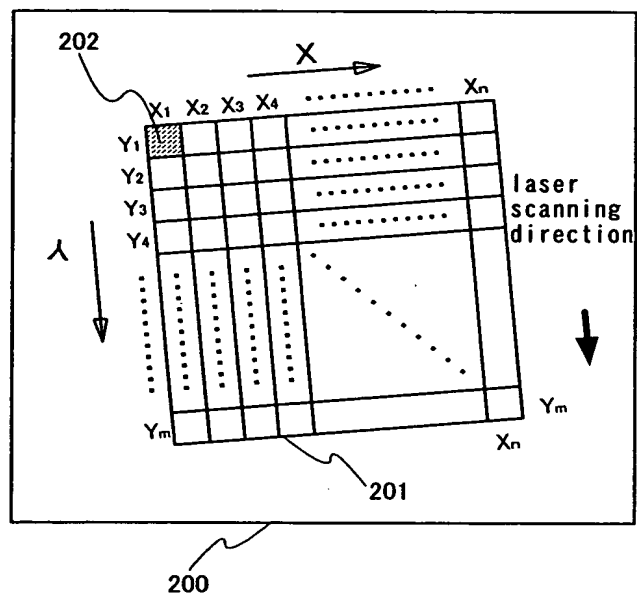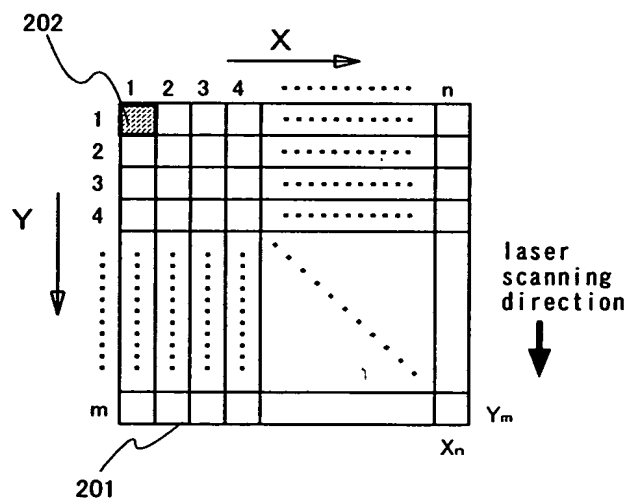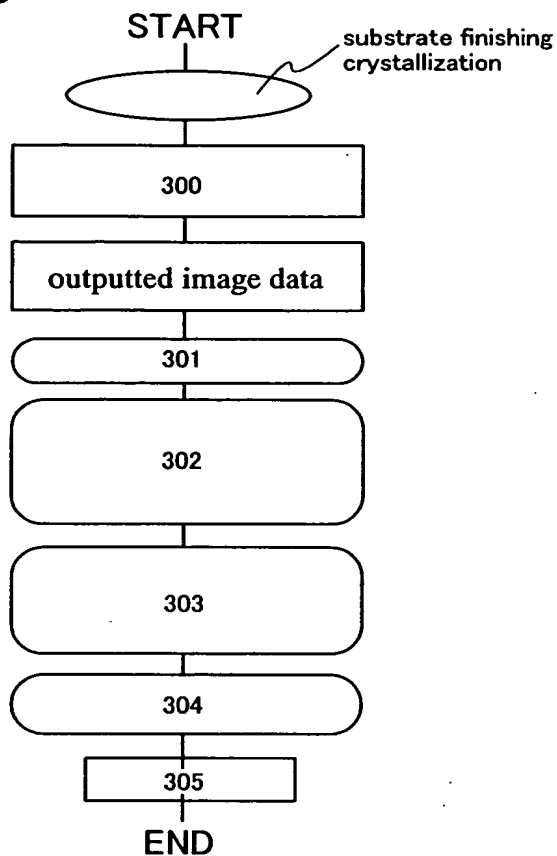
B:luminance value

$$Bt_{Y_1} = B_{(X_1,Y_1)} + B_{(X_2,Y_1)} + B_{(X_3,Y_1)} + \cdots + B_{(X_n,Y_1)}$$

$$Bt_{Y_2} = B_{(X_1,Y_2)} + B_{(X_2,Y_2)} + B_{(X_3,Y_2)} + \cdots + B_{(X_n,Y_2)}$$

$$Bt_{Y_3} = B_{(X_1,Y_3)} + B_{(X_2,Y_3)} + B_{(X_3,Y_3)} + \cdots + B_{(X_n,Y_3)}$$

$$\vdots \qquad \vdots \qquad \vdots \qquad \vdots \qquad \vdots$$

$$Bt_{Y_m} = B_{(X_1,Y_m)} + B_{(X_2,Y_m)} + B_{(X_3,Y_m)} + \cdots + B_{(X_n,Y_m)}$$

FIG.4

Laser Scanning Direction（Y-direction）

FIG.5A

Start
x=1,y=p+1,w=0,v=0 — 501

502 → A(x,y)>A(x,y-p) and A(x,y)>A(x,y+p) ?

— no → 506 w≧q ? — yes → 508 B(x,y)=0

502 — yes → 503 w=w+1

506 — no → 507 B(x-w, y)〜B(x,y)=0

504 w≧q ? — no →

504 — yes → 505 B(x-q+1,y)〜B(x,y)=1 v=v+1

509 w=0

v:counta1
w:counta2
A:input image
B:output image
p:constant number
q:constant number
n:x direction division number
m:y direction division number

510 x=n ? — no → 511 x=x+1

510 — yes →

512 y=m-p ? — no → 513 y=y+1, x=1, w=0

512 — yes → 514 END v=?

FIG.5B

basic unit

X →

laser scanning direction

analysis scope

Y

FIG.6

laser crystallization — 600

E = 1 E = 2 E = 3 .... E = t

601 — photographing
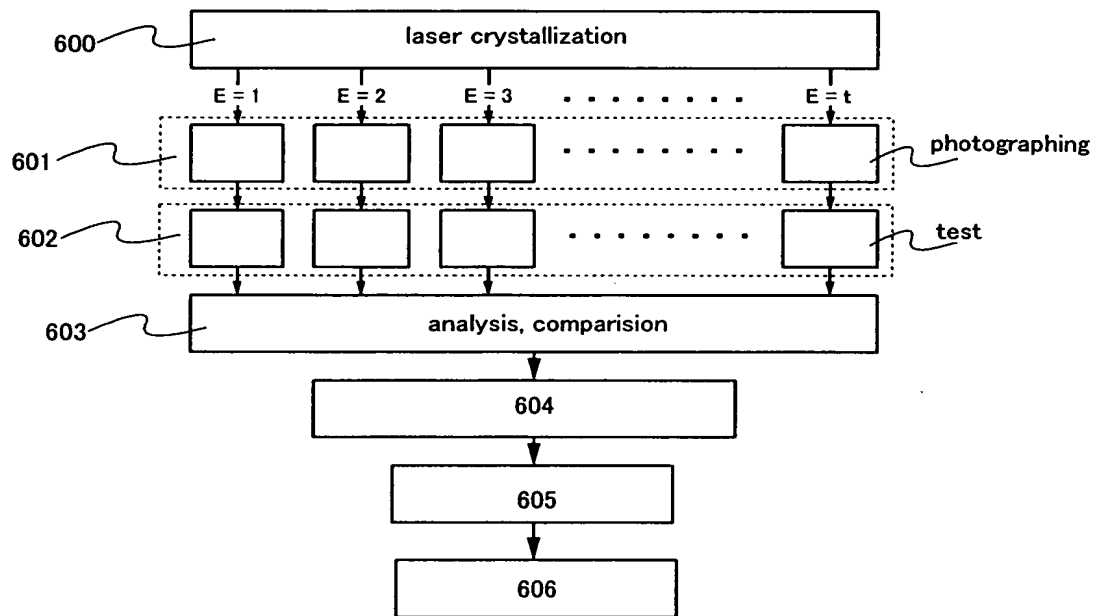
602 — test

603 — analysis, comparision
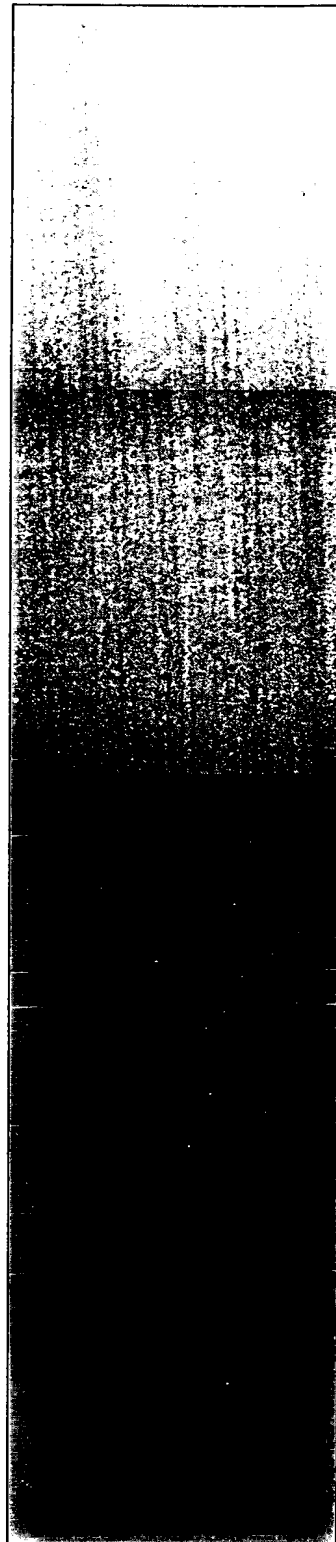
604

605

606

Fig.7A 379.0mJ/cm^2　　Fig. 7B 390.3mJ/cm^2　　Fig. 7C 404.5mJ/cm^2　　Fig. 7D 411.2mJ/cm^2
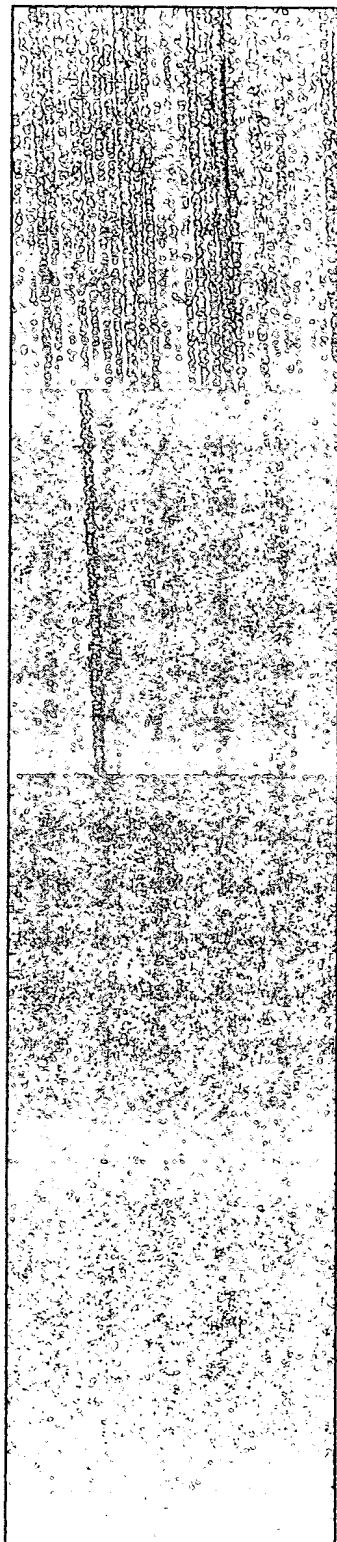
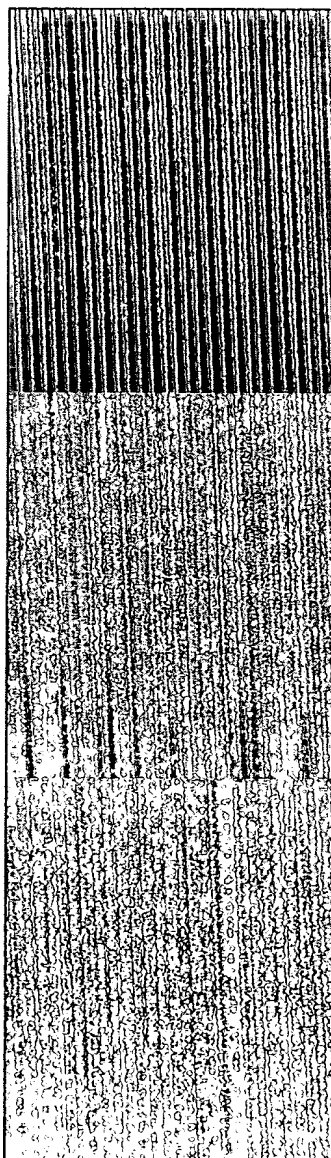Fig.7D 423.9mJ/cm^2　　Fig.7E 432.7mJ/cm^2　　Fig.7F 443.6mJ/cm^2　　Fig.7G 455.7mJ/cm^2

Fig.7H 466.3mJ/cm^2　　Fig.7I 475.4mJ/cm^2　　Fig.7J 487.2mJ/cm^2

After LC,CCD original image (dark field)×100 (Note that this is reduced to 16%.) Under Line; optimal condition in functional inspection

Fig.8A 379.0mJ/cm²   Fig.8B 390.3mJ/cm²   Fig.8C 404.5mJ/cm²   Fig.8D 411.2mJ/cm²
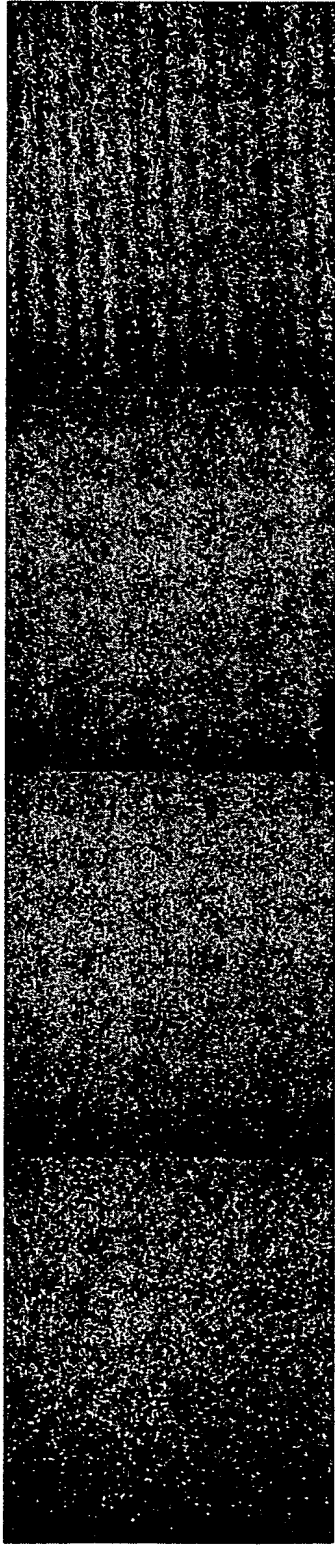
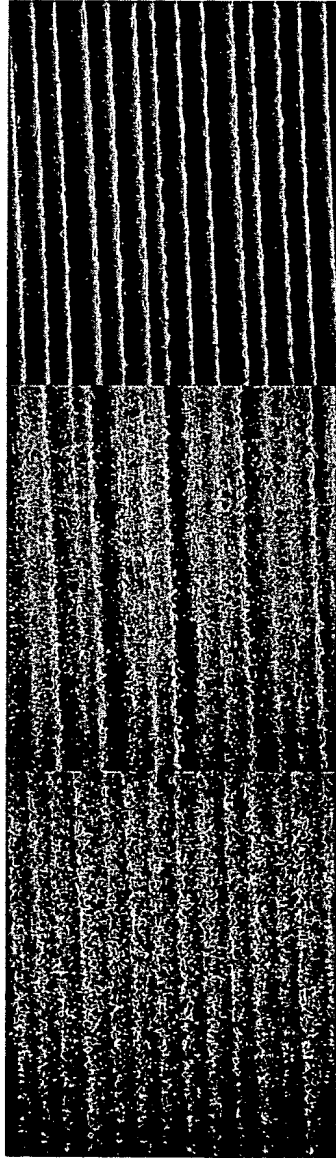Fig.8E 423.9mJ/cm²   Fig.8F 432.7mJ/cm²   Fig.8G 443.6mJ/cm²   Fig.8G 455.7mJ/cm²

Fig.8H 466.3mJ/cm²   Fig.8I 475.4mJ/cm²   Fig.8J 487.2mJ/cm²

After LC, CCD original image (dark field)×200 (Note that this is reduced to 16%.)
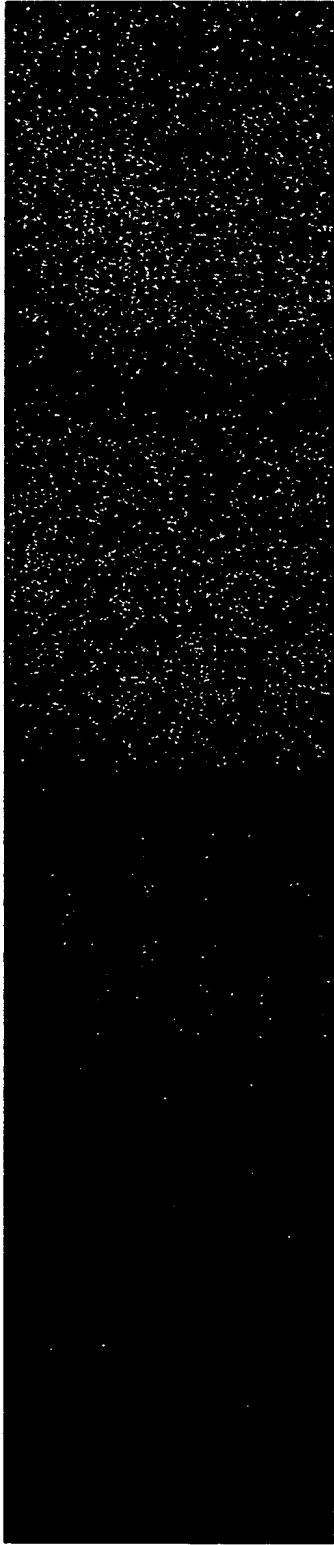
underline; optimal condition in functional inspection

Fig.9A 379.0mJ/cm² Fig.9B 390.3mJ/cm² Fig.9C 404.5mJ/cm² Fig.9D 411.2mJ/cm²

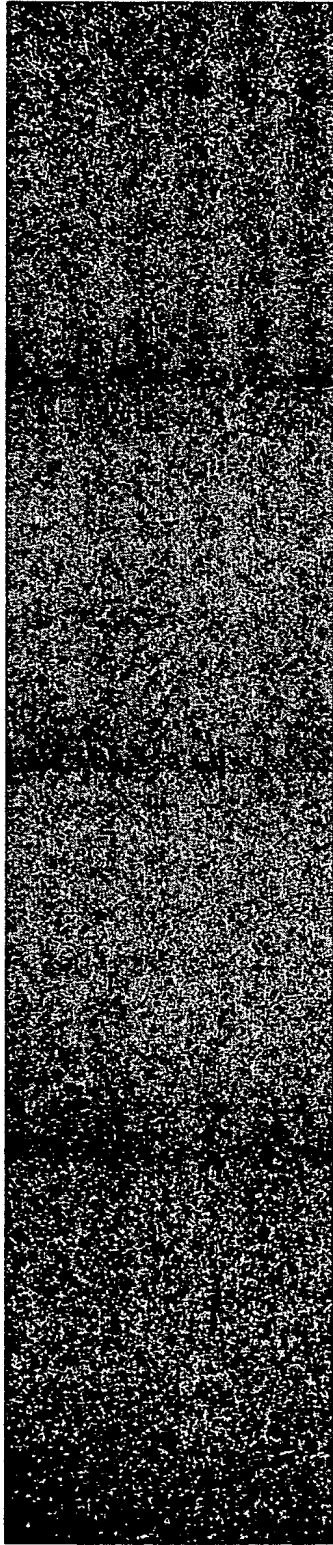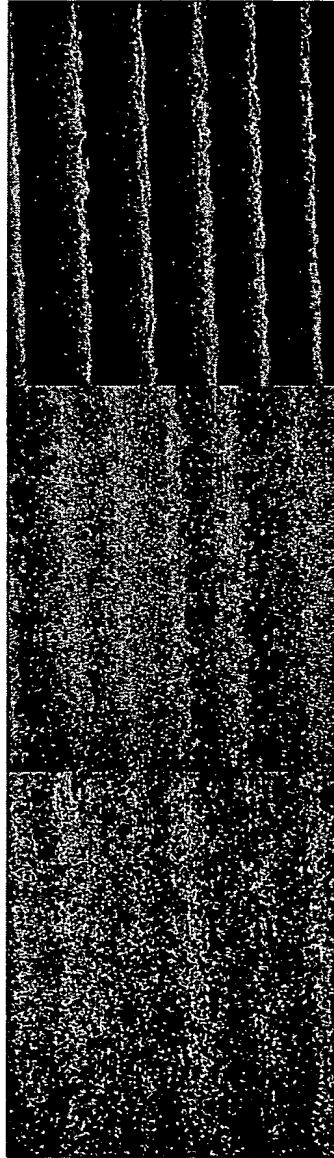Fig.9E 423.9mJ/cm² Fig.9F 432.7mJ/cm² Fig.9G 443.6mJ/cm² Fig.9H 455.7mJ/cm²

Fig.9I 466.3mJ/cm² Fig.9J 475.4mJ/cm² Fig.9K 487.2mJ/cm²

After LC, CCD original image (dark field) ×500 (Note that this is reduced to 16%.) Under Line: optimal condition in functional inspection

Fig.10A 379.0mJ/cm²

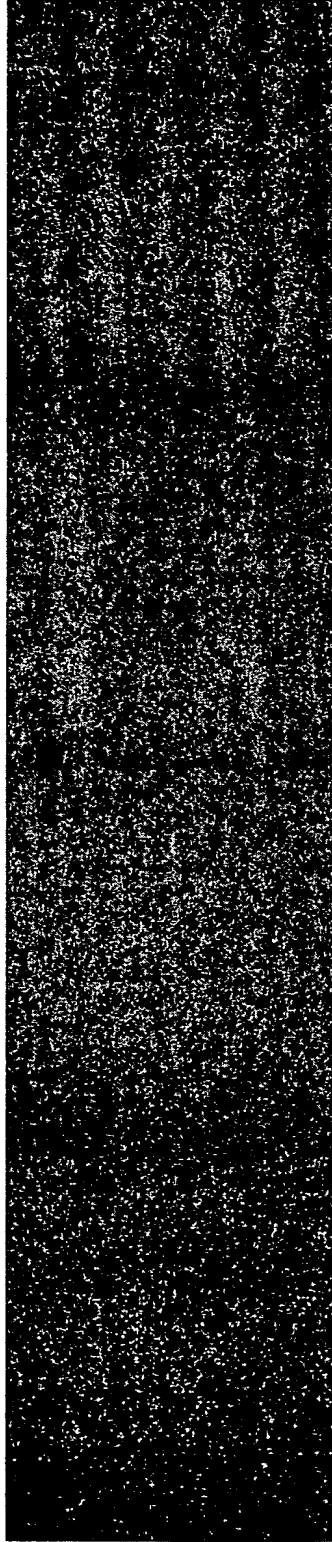Fig.10B 390.3mJ/cm²

Fig.10C 404.5mJ/cm²

Fig.10D 411.2mJ/cm²

Fig.10E 423.9mJ/cm²

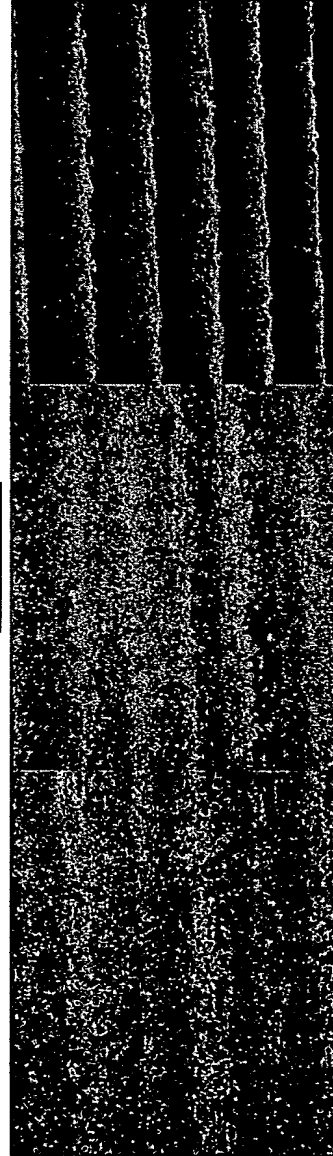Fig.10F 432.7mJ/cm²

Fig.10G 443.6mJ/cm²

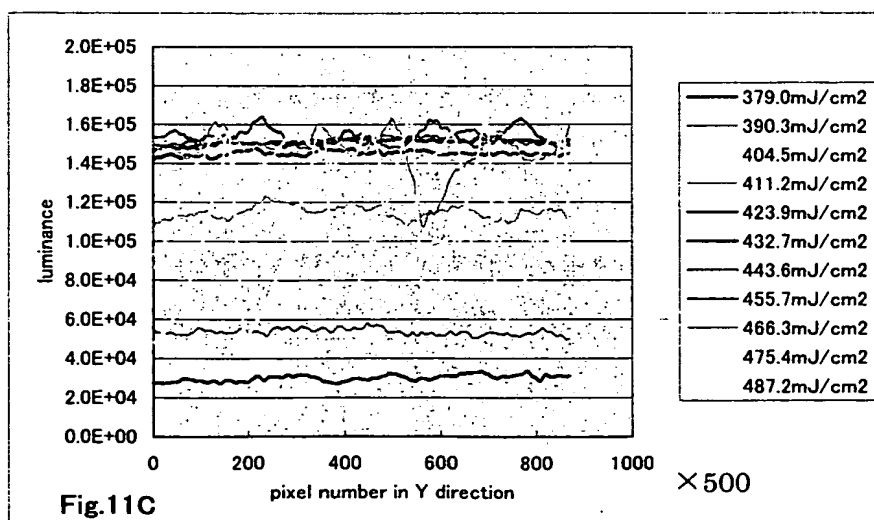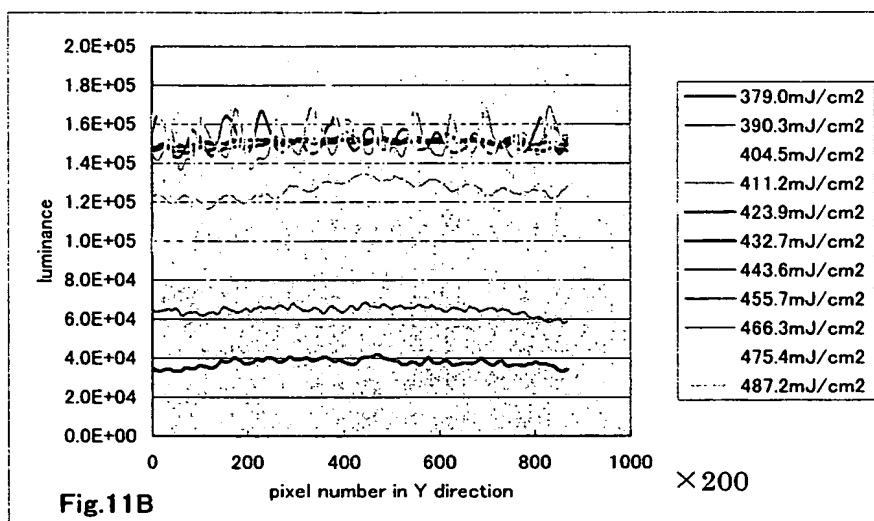Fig.10H 455.7mJ/cm²
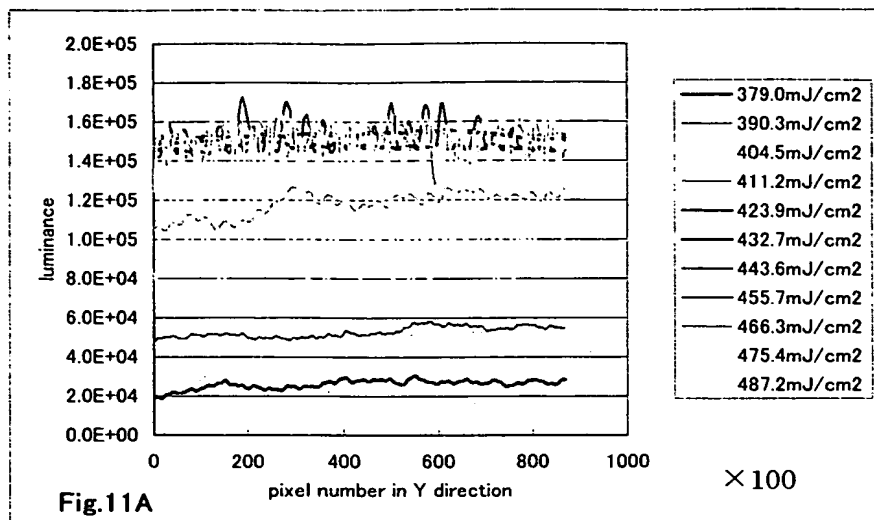
Fig.10I 466.3mJ/cm²

Fig.10J 475.4mJ/cm²

Fig.10K 487.2mJ/cm²

After LC, CCD luminance image (×500: Note that this is reduced to 16%)
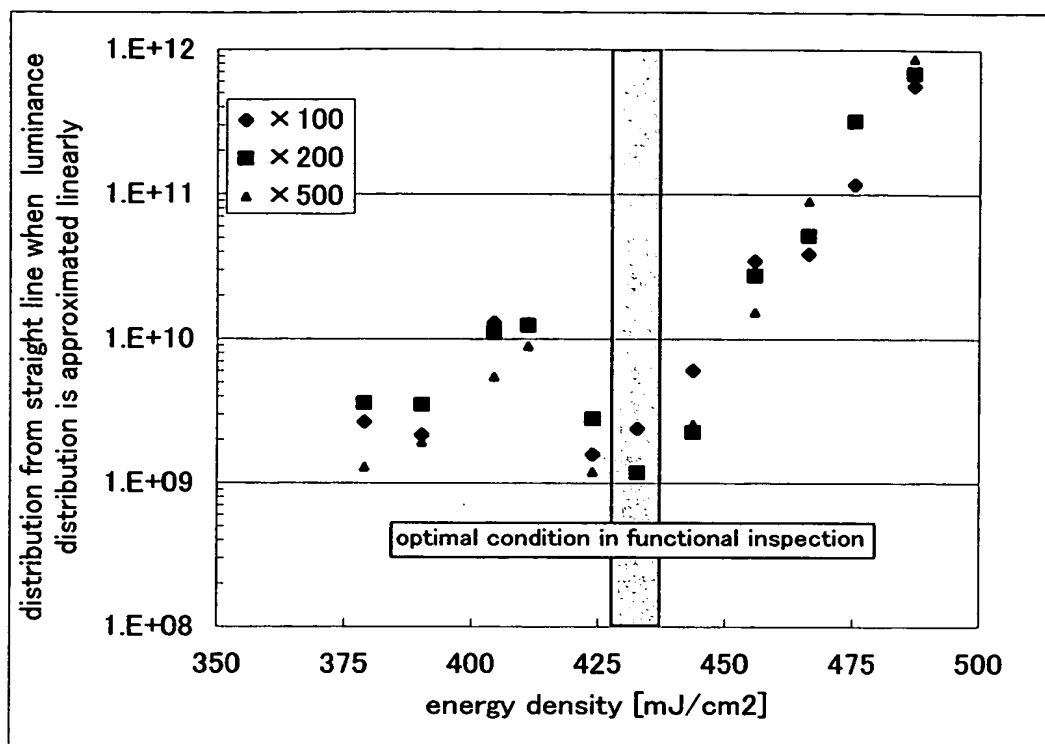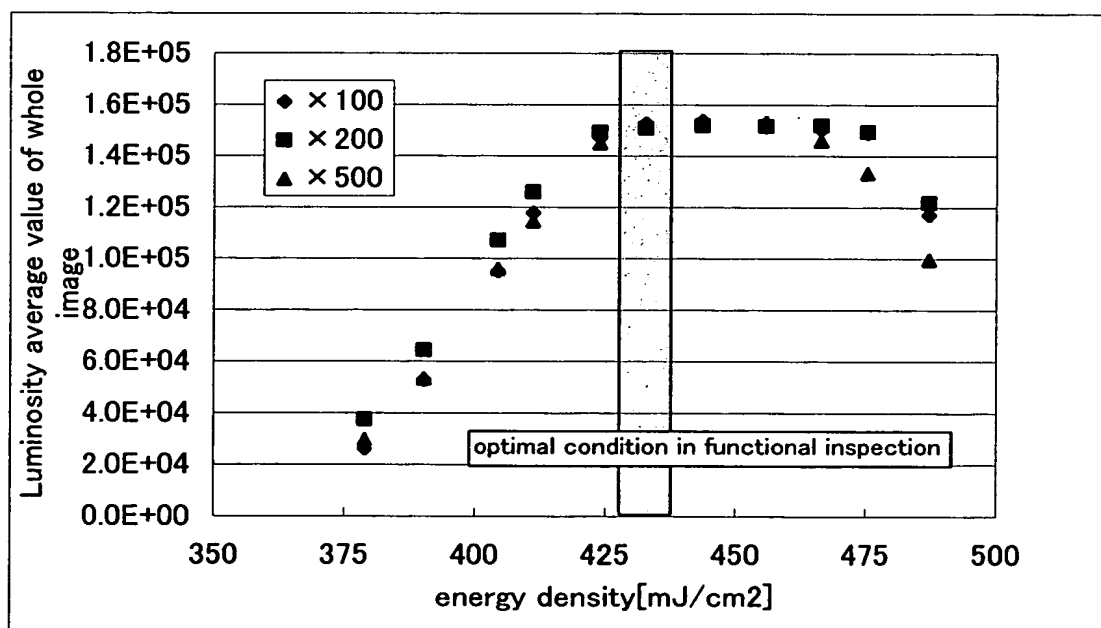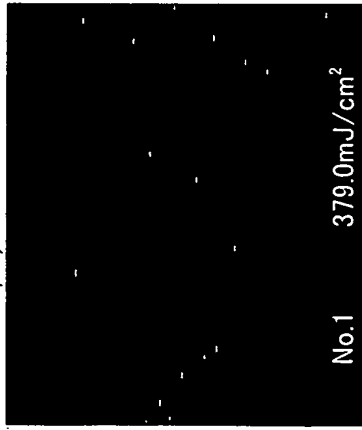underline; optimal condition in functional inspection.

Fig.11A   pixel number in Y direction   ×100

379.0mJ/cm2
390.3mJ/cm2
404.5mJ/cm2
411.2mJ/cm2
423.9mJ/cm2
432.7mJ/cm2
443.6mJ/cm2
455.7mJ/cm2
466.3mJ/cm2
475.4mJ/cm2
487.2mJ/cm2

Fig.11B   pixel number in Y direction   ×200

379.0mJ/cm2
390.3mJ/cm2
404.5mJ/cm2
411.2mJ/cm2
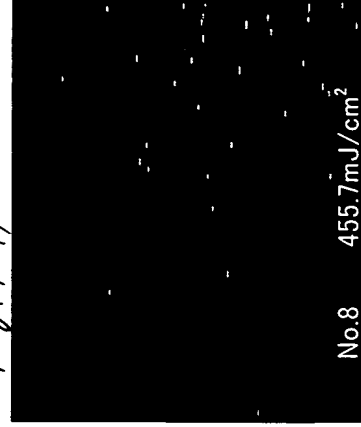423.9mJ/cm2
432.7mJ/cm2
443.6mJ/cm2
455.7mJ/cm2
466.3mJ/cm2
475.4mJ/cm2
487.2mJ/cm2

Fig.11C   pixel number in Y direction   ×500

379.0mJ/cm2
390.3mJ/cm2
404.5mJ/cm2
411.2mJ/cm2
423.9mJ/cm2
432.7mJ/cm2
443.6mJ/cm2
455.7mJ/cm2
466.3mJ/cm2
475.4mJ/cm2
487.2mJ/cm2

FIG. 12A

FIG. 12B

Fig. 13D

No.4   411.2mJ/cm^2

Fig. 13H

No.8   455.7mJ/cm^2

Fig. 13c

No.3   404.5mJ/cm^2

Fig. 13G

No.7   443.6mJ/cm^2

Fig. 13K

No.11   487.2mJ/cm^2

Fig. 13B

No.2   390.3mJ/cm^2

Fig. 13F

No.6   432.7mJ/cm^2

Fig. 13J

No.10   475.4mJ/cm^2

Fig. 13A

No.1   379.0mJ/cm^2

Fig. 13E

No.5   423.9mJ/cm^2

Fig. 13I

No.9   466.3mJ/cm^2

After LC, CCD extra image (×500; Note that this is reduced to 16%) **underline**: optimal condition in functional inspection.
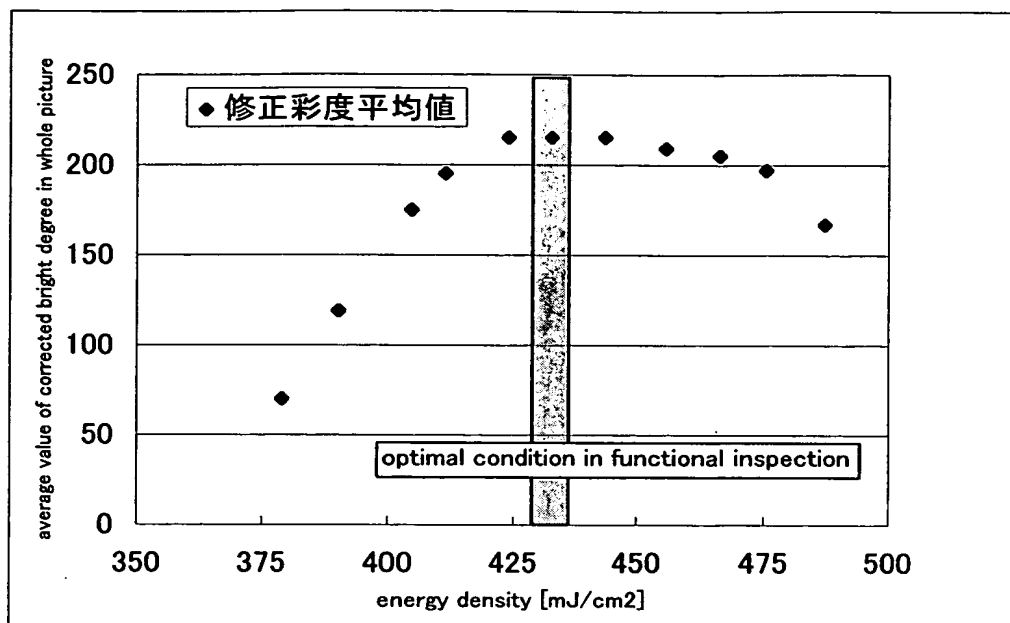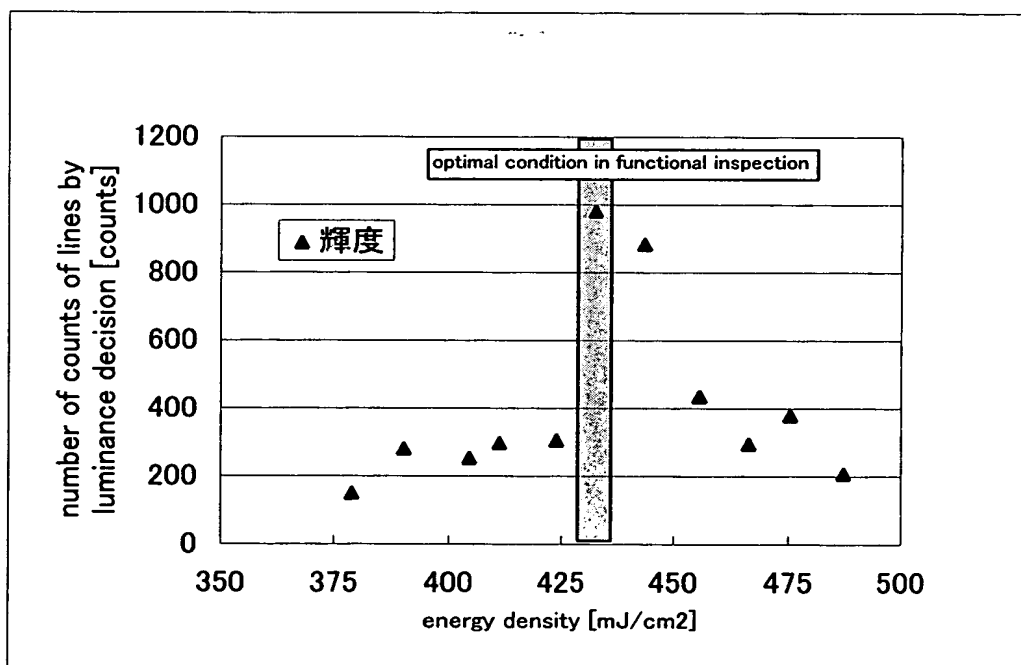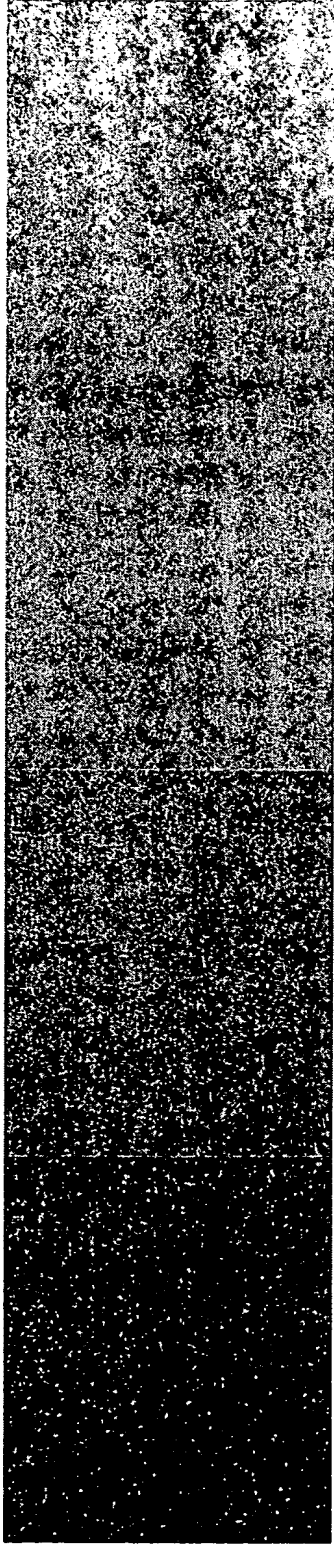
FIG. 14A ×500

FIG. 14B ×500

Fig.15A 379.0mJ/cm²

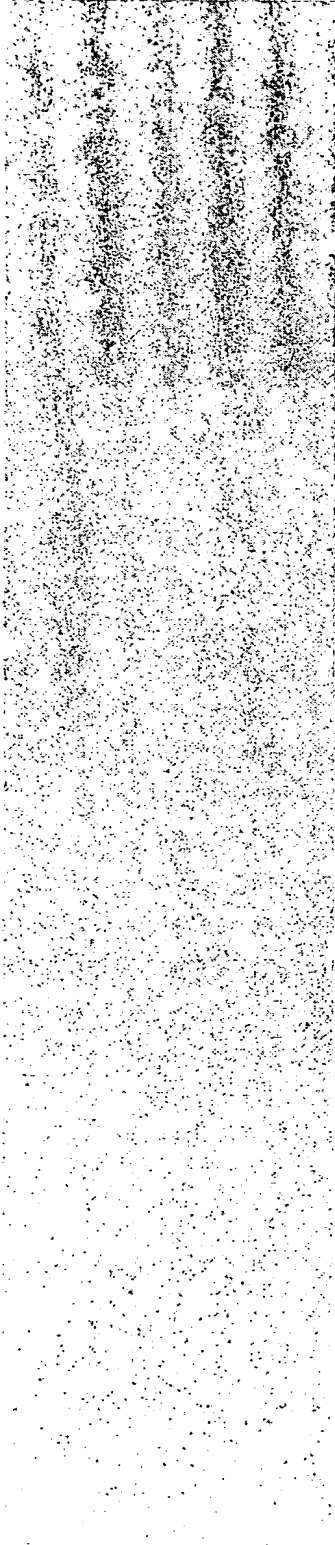Fig.15B 390.3mJ/cm²

Fig.15C 404.5mJ/cm²

Fig.15D 411.2mJ/cm²

Fig.15E 423.9mJ/cm²

Fig.15F 432.7mJ/cm²

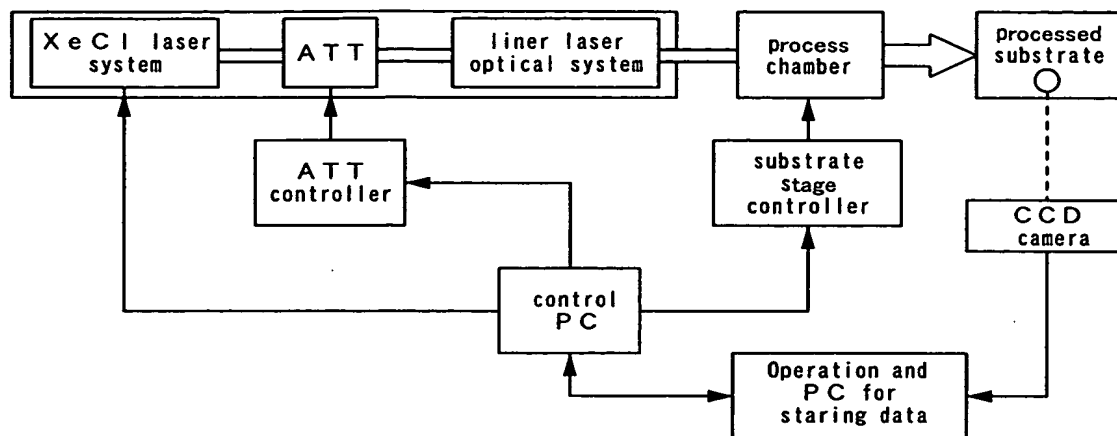Fig.15G 443.6mJ/cm²

Fig.15H 455.7mJ/cm²

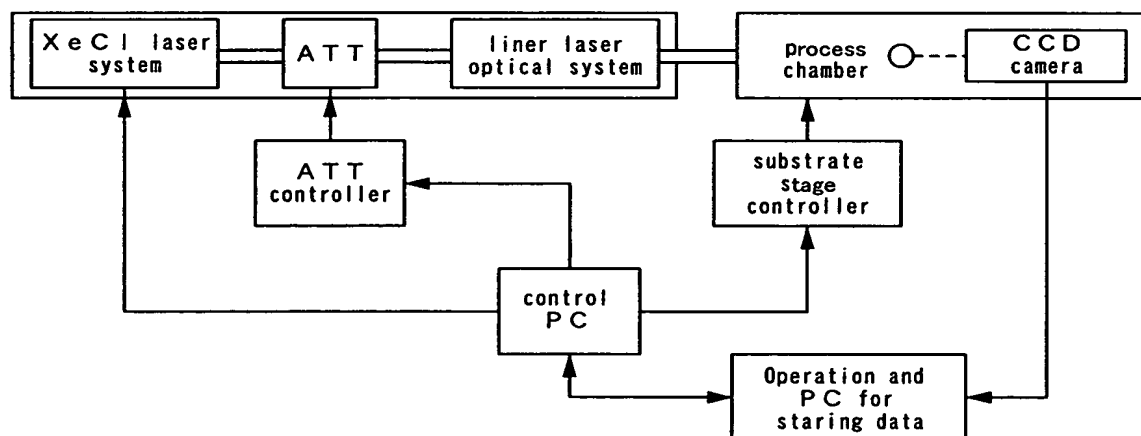Fig.15I 466.3mJ/cm²

Fig.15J 475.4mJ/cm²

Fig.15K 487.2mJ/cm²

After LC, CCD image of modified bright degree (×500; Note that this is reduced to 16%.)
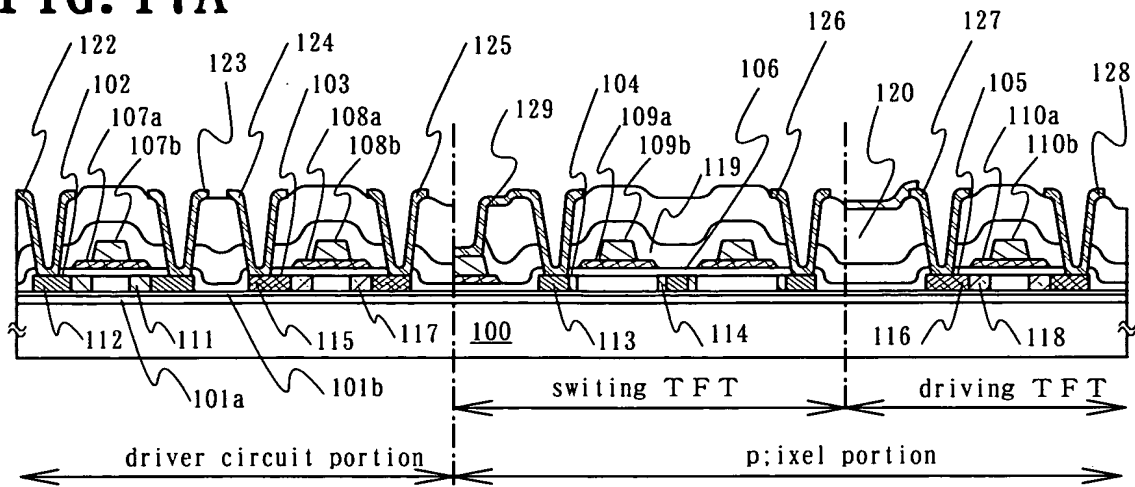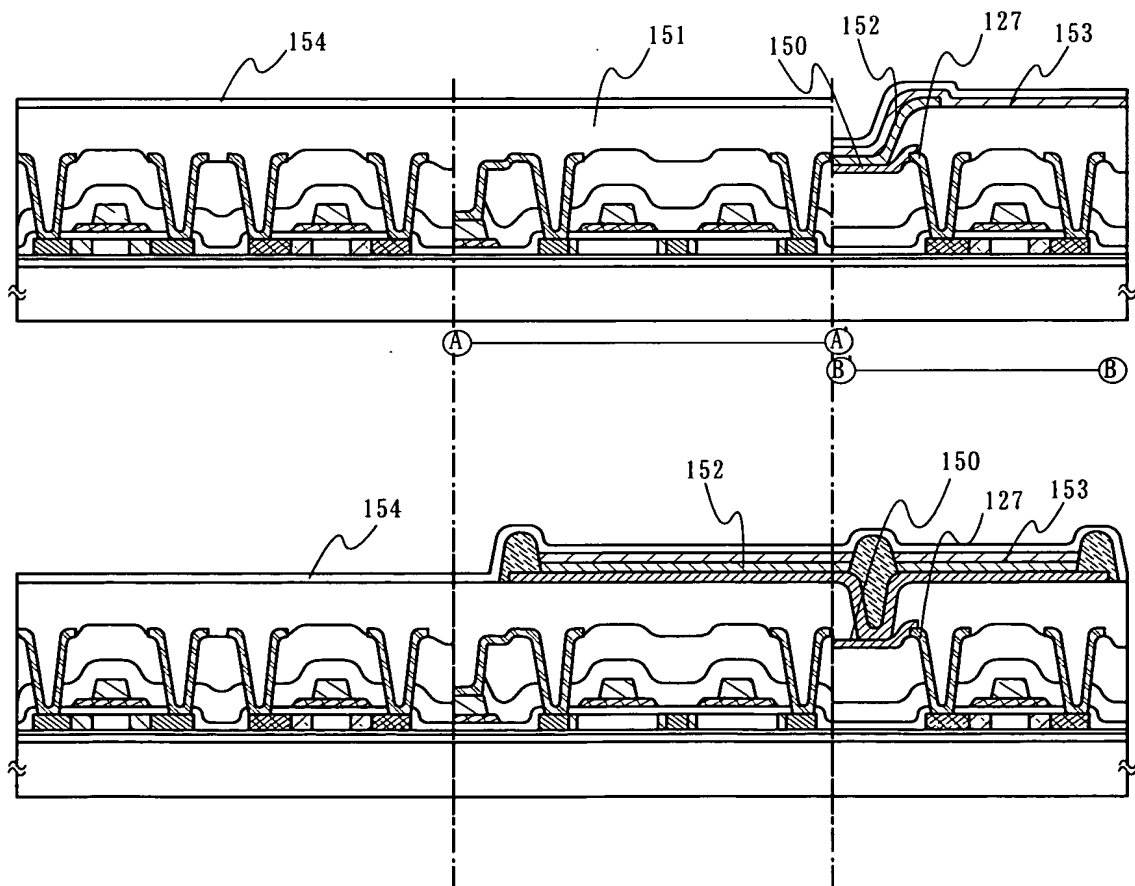underline; optimal condition in functional inspection

FIG.16A

```
┌─────────────────────────────────────────────────────────────────────────┐
│  ┌─────────────┐   ┌───────┐   ┌──────────────┐     ┌─────────┐    ⟹   ┌──────────────┐
│  │ X e C l laser│══│ A T T │═══│ liner laser  │═════│ process │        │  processed   │
│  │   system    │   │       │   │optical system│     │ chamber │        │  substrate   │
│  └─────────────┘   └───────┘   └──────────────┘     └─────────┘        │      ○       │
└──────────────────────────────────────────────────────────────────────  └──────────────┘
```
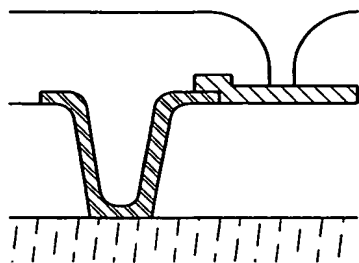
XeCl laser system — ATT — liner laser optical system — process chamber ⟹ processed substrate ○

ATT controller

substrate stage controller

CCD camera

control PC

Operation and PC for staring data

FIG.16B

XeCl laser system — ATT — liner laser optical system — process chamber ○ ---- CCD camera

ATT controller

substrate stage controller

control PC

Operation and PC for staring data

FIG. 17A

driver circuit portion | pixel portion

switing TFT | driving TFT

FIG. 17B

FIG.18A

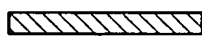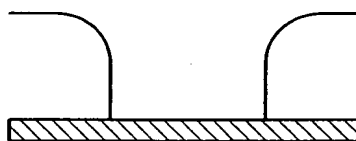# FIG.18B

FIG.18C
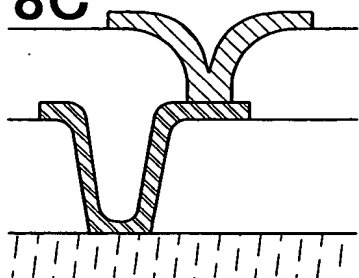
transparent conductive film

wring
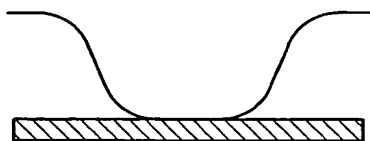
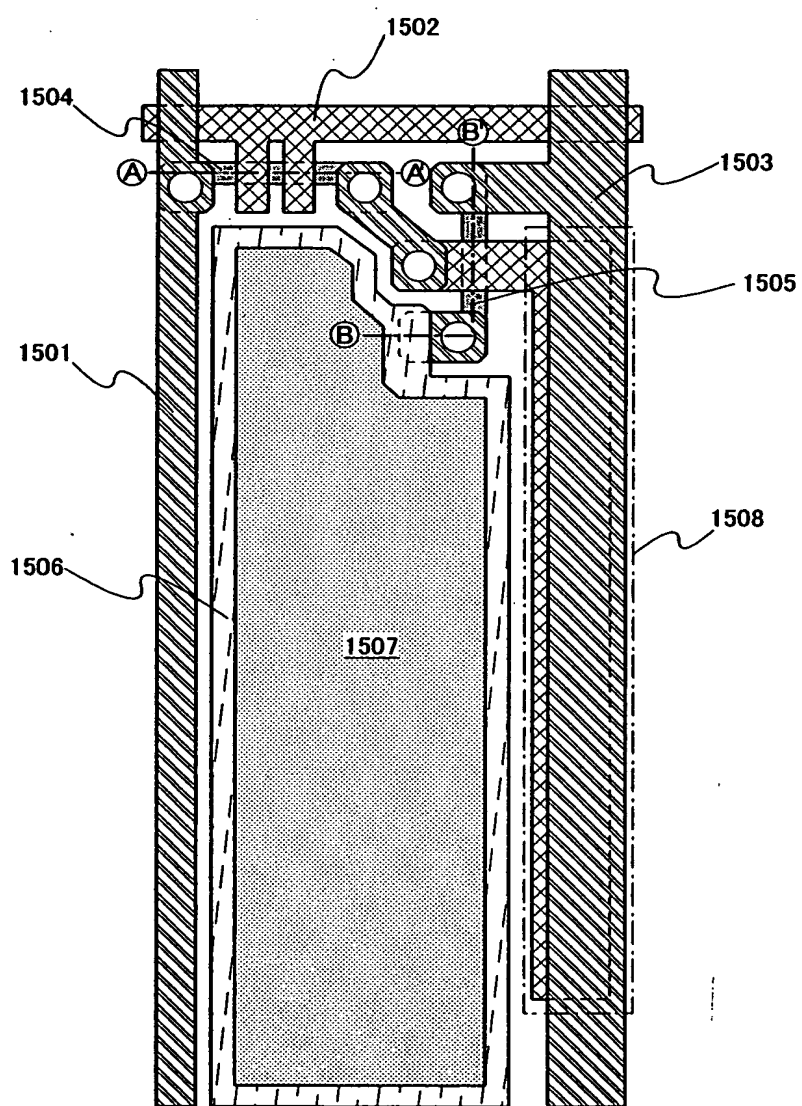# FIG.18D

FIG.18E

FIG.18F
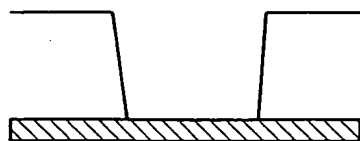
transparent conductive film

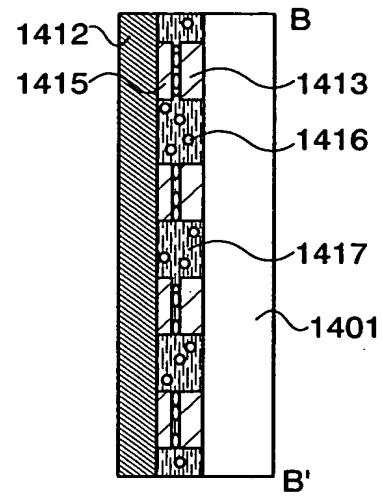# FIG.19

FIG.20A

1407 1404a 1403 1411

B
B'
A'

A

1406 1404b 1502 1405 1401

(Note: labels along bottom read 1406, 1404b, 1402, 1405, 1401)

FIG.20B

1412
1415

B

1413
1416

1417

1401

B'

FIG.20C

1406 1408 1407 1409 1410 1406 1412

A   A'

1402 1403 1405 1411

FIG.21A

2003 2001

2004

2004

FIG.21B

2106 2101 2103

2105

2104 2102

FIG.21C

2202
2203

2201

2206 2204
2205

FIG.21D

2303
2301
2302

2305

2304

FIG.21E

2402 2403

2401

2407
2406
2405 2404

FIG.21F

2502 2501 2503

FIG.21G

2608
2610

2606

2605

2601

2604

2609 2607

2602 2603

FIG.21H

2704
2706
2701

2707

2708 2705 2702 2703

FIG.22A

808 801 804 803 802 806 807 805 804 800

FIG.22B

801

| 812 SRAM1 | 813 SRAM2 |

808 I/F

809 A/D Converter

R Video signal
G Video signal
B Video signal
AC Cont
CLK1
CLK2

810 PLL

H sync
V sync

811

800

802

(Nch:▲/Pch:●)

Fig.23A

S value[V/dec] (VD=14V)

irradiation energy density[mJ/cm2]

(Nch:▲/Pch:●)

Fig.23B

Vth[V](VD=-14V)

irradiation energy density[mJ/cm2]

(Nch:▲/Pch:●)

Fig.23C

IG_off[pA](VD=-1V)

irradiation energy density[mJ/cm2]

FIG.24A

FIG.24B